



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/848,509	05/03/2001	William S. Wheat	8540G-000008	7572

27572 7590 05/19/2004

HARNESS, DICKEY & PIERCE, P.L.C.  
P.O. BOX 828  
BLOOMFIELD HILLS, MI 48303

EXAMINER
----------

WILLS, MONIQUE M

ART UNIT	PAPER NUMBER
----------	--------------

1746

DATE MAILED: 05/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/848,509

Applicant(s)

WHEAT ET AL.

Examiner

Monique M Wills

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 2/17/04.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5,7-10,12-15 and 17-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5,7-10,12-15 and 17-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

DETAILED ACTION

*Response to Amendment*

This Office Action is responsive to the Amendment filed February 17, 2004. Claims 1,6,11 & 16 have been cancelled. The rejection of claims 1,16 & 20 under 35 U.S.C. 102(e) as being anticipated by Voss et al., U.S. Patent 6,106,964, is overcome. The rejection of claims 6, 10-11,15 & 25 under 35 U.S.C. 103(a) as being unpatentable over Voss et al., U.S. Patent 6,106,964, is overcome.

The rejection of claims 2,3,5,17,18 & 29 under 35 U.S.C. 102(e) as being anticipated by Voss et al. U.S. Patent 6,106,964, is reapplied in view of Applicant's remarks. The rejection of claims 7-8, 12-13, 21-23, 27& 28 under 35 U.S.C. 103(a) as being unpatentable over Voss et al., U.S. Patent 6,106,964, is maintained. The rejection of claims 4, 9, 14,19 & 24 under 35 U.S.C. 103(a) as being unpatentable over Voss et al., U.S. Patent 6,106,964, in view of Kanai et al. U.S. Pub. 2001/0021468, is maintained. Claims 10,15,29,25 & 26 are newly rejected under 35 U.S.C. 103(a) as being unpatentable over Voss et al., U.S. Patent 6,106,964, in view of Kanai et al. U.S. Pub. 2001/0021468 as necessitated by amendment.

*Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

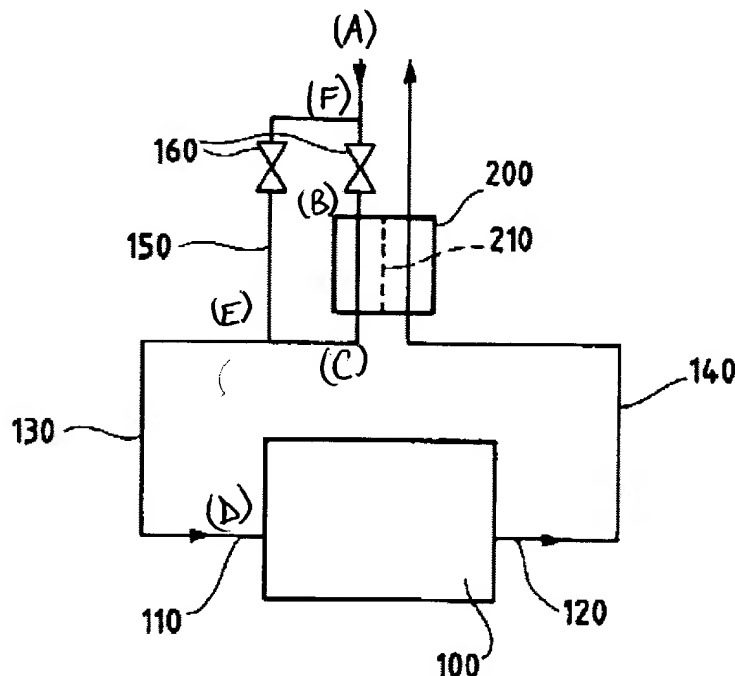
A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent,

Art Unit: 1746

except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 2,3,5,17, 18 & 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Voss et al. U.S. Patent 6,106,964.



With respect to claims 2, 3, 17 & 18, Voss teaches a humidity control system comprising a gas supply (A), a humidifier 200 including an inlet (B) connected to said gas supply (A) and an outlet (C) and a fuel cell stack 100 including an inlet (D) that is connected to the outlet (C) of said humidifier 200. With respect to claims 2 & 3, valve 160 is located in the bypass line 150, wherein the bypass line 150 has one end (F) connected between said gas supply (A) and said humidifier 200 and an opposite end (E) connected between said outlet (C) of said humidifier and said inlet (D) of said fuel cell stack. See figure 1. With respect to claims 17 & 18, the bypass line also has one end (F) connected between said gas supply (A) and valve

160(b) and an opposite end (E) connected between said outlet (C) of said humidifier and said inlet (D) of said fuel cell stack. See Figure 1. With respect to claims 17 & 18, valve 160 is located between said gas supply (A) and said inlet (B) of said humidifier. See Figure 1. With respect to claims 5 & 29, the inlet to the fuel cell stack may be the cathode flow line or the anode flow line (col. 7, lines 25-32). The instant claims are anticipated by the prior art set forth. The limitation in claims 2 & 17, with respect to valve 160 being a restriction valve, is considered to be an inherent property of the valve as set forth in the prior art, because Voss teaches that valve 160 can cutoff flow to the humidifier (col. 9, lines 35-45), and supply dry gas directly to the fuel cell stack. The limitation in claims 3 & 18, with respect to the system including a single valve that controls the proportion of gas flowing from the gas supply through the humidifier to the fuel cell stack and through the bypass line to the fuel cell stack, is considered to be an inherent property of the valve set forth in the prior art, because Voss teaches that valve 160 may be completely opened or closed, to limit flow through the humidifier (col. 9, lines 35-45). A valve that completely opens and closes, is capable of partial opening and closing, which would inherently proportion the amount of gas through the bypass line and humidifier. Therefore, the claims are anticipated by Voss.

*Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7-8, 12, 13, 21-23, 27 & 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Voss et al., U.S. Patent 6,106,964.

Voss teaches a humidity control system for a fuel cell stack as described hereinabove. With respect to claims 7 & 12, the reference teaches a single 3-way valve, embracing applicant's directional valve (col. 9, Lines 35-45). With respect to claim 22, valve 160 is an air restriction valve as described in §102 (e) above. See also, column 9, lines 35-45. With respect to claim 23, valve 160 controls the amount of gas flowing from the gas supply through the humidifier and bypass valve as described in §102 (e) above. With respect to claims 27 & 28, the inlet to the fuel cell stack may be the cathode flow line or the anode flow line (col. 7, lines 25-32).

The reference is silent to the valve being located at the end of the bypass line connected between the gas supply and humidifier (claim 8) and alternatively, connected between the humidifier and fuel cell stack (claims 13 & 21).

However, it would have been obvious to one skilled in the art at the time the Instant invention was made to employ the valve at the end of the bypass line, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70. The skilled artisan recognizes that placement of the valve effects flow rate and pressure throughout the humidification system.

*Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 9, 14, 10, 15, 19, 20 & 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Voss et al., U.S. Patent 6,106,964, in view of Kanai et al. U.S. Pub. 2001/0021468.

Voss teaches a humidity control system for a fuel cell stack as described hereinabove. With respect to claims 10, 15, 20 & 25-26, the inlet to the fuel cell stack may be the cathode flow line or the anode flow line (col. 7, lines 25-32).

Voss is silent to a humidity sensor and a controller connected to said humidity sensor (claims 4, 9, 14, 19 & 24).

Kanai teaches that it is conventional to employ a humidity sensor and controller to adjust the amount of water in air supply to the fuel cell (228), in order to prevent insufficient amounts of humidification during normal operation of the fuel cell (par. 00150).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the humidity sensor and controller of Kanai in the system Voss, in order to adjust the amount of water supplied to the fuel cell, in order to prevent insufficient amounts of humidification during normal operation of the fuel cell.

*Response to Arguments*

Applicant asserts that Voss does not anticipate or suggest a valve that is capable of controlling the proportion of flow simultaneously supplied to two branches. Applicant points to column 9, lines 35-45, where it describes that valve 160 may cut off flow through the humidifier (CHHE) and solely supply reactant to the fuel cell during shut-down or, during operation, purge the stack with dry gas. Therefore, valves 160 are arranged to provide flow *either* through the stack, bypassing the humidifier, or through the humidifier to the stack. This argument is not persuasive. A valve that completely opens and closes, is capable of partial opening and closing, which would inherently proportion the amount of gas through the bypass line and humidifier. Specifically, if one valve is completely open and the other valve is partially open, then the partially open valve would have a simultaneously controlling effect.

Regarding the placement of valve 160, Applicant contends that Voss does not teach the valve being located between the humidifier and fuel cell stack, or completely outside the bypass line. The examiner disagrees. Voss specifically teaches valve 160 completely outside the bypass line in Figure 1. Regarding various placement of the valve, it would have been obvious to arrange said valve in various location, since it involves only routine skill in the art. The skilled artisan recognizes that placement of the valve effects flow rate and pressure throughout the humidification system.

Concerning the combination of Voss in view of Kanai, Applicant argues that Kanai does not cure the deficiencies of Voss, because the reference teaches a controller that opens and closes a valve that supplies water to an injector. The controller does not control a valve in a reactant line upstream of the humidifier, or a valve in a bypass line. This argument is not persuasive. Kanai is relied upon to demonstrate the conventionality of employing valve/controller systems to manage humidity to a fuel cell stack. Although Kanai teaches



controlling a valve, that controls the inlet of water into an injector, that in turn, injects water into a humidifier, ultimately the overall function of the valve is to manage the amount of water entering the fuel cell stack.

As to the rejections that have been overcome: claims 1, 6, 11 & 16 have been canceled, rendering the rejection of claims 1 & 16 under 35 U.S.C. 102(e) as being anticipated by Voss et al. U.S. Patent 6,106,964, and the rejection of claims 6 & 11 under 35 U.S.C. 103(a) as being unpatentable over Voss et al., U.S. Patent 6,106,964 moot. The rejection of claim 20 is moot because the claim now depends on claim 19, which requires the humidity system to contain a humidity sensor and controller of which Voss is silent to. Therefore, the rejection of claim 20 under 35 U.S.C. 102(e) as being anticipated by Voss et al. U.S. Patent 6,106,964, is overcome. Kanai, as cited hereinabove, cures the deficiencies of Voss. The rejection of claims 10, 15 & 25 is moot because the claims now depend on claims 9, 14 and 24 respectively, which require the humidity system to contain a humidity sensor and controller of which Voss is silent to. Therefore, the rejection of claims 10 & 15, under 35 U.S.C. 103(a) as being unpatentable over Voss et al., U.S. Patent 6,106,964, is overcome. Kanai, as cited hereinabove, cures the deficiencies of Voss.

### *Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

Art Unit: 1746

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (571) 272-1309. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

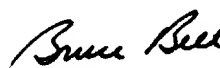
If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Randy Gulakowski, may be reached at 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MW

5/8/04

  
BRUCE F. BELL  
PRIMARY EXAMINER  
GROUP 1746

Application/Control Number: 09/848,509  
Art Unit: 1746

Page 10